Construal Level Moderates the Relationship between Temperamental Reactivity and Depressive Symptoms

A Senior Honors Thesis

Presented in partial fulfillment of the requirement for graduation with Research Distinction in Psychology in the undergraduate colleges of the Ohio State University

By:
Emil Moldovan

The Ohio State University
June 2010

Project Advisor: Dr. Michael W. Vasey, Department of Psychology

Acknowledgements

I first of all thank Dr. Michael Vasey for helping me ground my speculations in the empirical realities of psychological science. The graduate and undergraduate students working in Dr. Vasey's Cognition and Emotion Laboratory were instrumental to this project via their help in data collection. I would also like to thank a thesis committee member, Dr. Kentrao Fujita, for his insightful suggestions. I am indebted to Joseph Roberts, a graduate student of Dr. Fujita's, who greatly helped me understand the social psychology research which is so central to this thesis. The Psychology Honors Research Mentorship program organized by Dr. Alisa Paulsen provided the initial context in which I was so fortunate to interact with all these people. I would lastly like to thank my parents for introducing me to the field of psychology, and for supporting my development as a researcher.

Table of contents

Abstract

Deficits in self-control are central to many current theories of psychopathology (e.g. Lonigan, Vasey, Phillips, & Hazen, 2004). Adopting a high-level construal demonstrably leads to higher levels of self control than does adapting a lower level of construal (Fujita, Trope, Liberman, & Levin-Sagi, 2006) where "High-level construal consist of general, decontextualized features of an event that convey the essence of information...whereas lower level construal include more concrete, contextualized and incidental features" (Trope & Liberman, 2003). We thus hypothesized that that lower levels of construal should be associated with higher symptoms of emotional disorders. Furthermore, the vulnerability for emotional disorder symptoms associated with temperamental emotional reactivity should be moderated by the construal level adopted by individuals. However, other research traditions maintain that higher construal levels *increase* the risk for depression (Watkins, Moberly & Moulds, 2008) because they increase state emotional reactivity. This study tested these contradictory hypotheses. 125 undergraduate students completed the Short Form of the Adult Temperament Questionnaire, the Depression, Anxiety and Stress Scales, the Beck Depression Inventory and The Behavior Identification Form (which taps construal level). A multiple regression yielded that the Negative Reactivity x Construal Level interaction was significant at the p=.05 level to predict depressive symptoms. However, construal level did not moderate the association between Negative Reactivity and Stress and did not moderate the association between Negative Reactivity and Anxiety. Further, construal level did not moderate the association between Positive Reactivity and any of the emotional symptoms. These findings are more consistent with Fujita *et al.* (2004) than with Watkins *et al.* (2008). We

propose ways to reconcile the current findings with both previous research traditions. Finally, we suggest that efforts to raise a person's construal level in therapy may offer a potential avenue to preventing the development of emotionbal disorders.

Introduction

Over recent years, many branches of psychology have seen a steady interest in self-control processes (e.g. Drabman, Spitalnik & O'Leary, 1973; Baumeister & Heatherton, 1996; Higgins & Kruglanski, 2000). Among clinical psychologists, deficits of self-control are thought to play a central role in current theories of psychopathology (e.g., Lonigan, Vasey, Phillips, & Hazen, 2004; Kaiser, Unger, Kiefer, Markela, Mundt & Weisbrod, 2003). For example, Lonigan *et al*. (2004) emphasize that deficits in effortful control (EC; i.e., capacity for self-regulation) enhance risk for symptoms of anxiety disorders and depression. Effortful control (EC) is generally understood as "the ability to inhibit a dominant response to perform a subdominant response." (Rothbart & Bates, 1998). When a person has a reactive (i.e., automatic) tendency to behave in a certain fashion, EC is associated with the ability to override that behavioral tendency in the favor of a more adaptive response. When people have deficits in EC, their reactions to their environment are more automatic. This is likely to be problematic when an individual's automatic responses to the environment are extreme.

An example of an automatic aspect of a person's emotional structure is known as negative reactivity or negative affectivity (NA). NA is a relatively stable trait of individuals (Leon, Gillum, Gillum & Gouze, 1979; Watson & Clark, 1984) and NA is related to what "The Big Five Model of Personality" refers to as neuroticism (McCrae & Costa, 1997; Judge, Higgins, Thoresen & Barrick, 1999). Rothbart, Ahadi, & Evans, (2000) found a high correlation between temperament as measured when infants were one year old, and temperament as measured whey they were seven years old. Clark and Watson's tripartiate model understands NA as the tendency to experience emotionally

unpleasant interactions with the environment (Clark & Watson, 1991). A person high in NA should be expected to experience more distress in response to a negative life event than a person low in NA (Moyle, 1995).

Recent work suggests that heightened NA is a key contributor to vulnerability to multiple disorders such as anxiety disorders and depression (Clark, Watson, & Mineka, 1994; Lonigan, Vasey, Phillips & Hazen, 2004). However, this effect is moderated by EC. Even if people are high in NA, high levels of EC should help them to avoid the potentially pathological implications of intense and prolonged distress (Lonigan & Vasey, 2009). For example, individuals high in NA who go through several weeks of stressful conditions at work should be able to overcome their aversive reaction and perform the work. If, on the other hand, they would start skipping work because their lack of self-control, they might eventually get fired and this would put them at a greater risk for depression.

After EC and NA, positive reactivity is a third element of Clark and Watson's tripartite model (Clark *et al*., 1994). Positive affectivity (PA) involves a person's tendency to be pleasurably engaged with the world. A person low in PA should be expected to find little enjoyment in experiences that most people would find pleasant and rewarding. Associated with this lack of pleasurable engagement is reduced to tendency to seek such experiences. However, high levels of EC (i.e., self-control) should be expected to enable a person who is low in PA to nonetheless approach such experiences. For example, depressed people sometimes need to forcibly motivate themselves to develop their social networks, even when they do not desire social contact or to engage in activities they enjoyed before becoming depressed. High levels of PA can be pathological

as well. For example, someone who is prone to seek high-intensity pleasures may become addicted to illicit substances. Thus, high levels of EC are useful to control both excessively high or low levels of PA.

Another branch of psychology that has taken much interest in self-control processes is social psychology. Research stemming from Construal Level Theory (CLT; Fujita, Trope, Liberman, & Levin-Sagi, 2006) provides a prominent example of such an approach. According to CLT, people can construe a situation in either a high or low manner: "High-level construals consist of general, decontextualized features of an event that convey the essence of information...whereas lower level construals include more concrete, contextualized and incidental features" (Trope & Liberman, 2003). Semin & Klaus (1988) organize words relating to the behavior of people into four levels of abstraction. In increasing level of abstraction these levels are: i) descriptive action verbs, ii) interpretive action verbs, iii) state verbs, and iv) adjectives. CLT can be better understood in light of this model. Thinking of behavior in terms of it goals (i.e., interpretive action verbs) is of a higher construal level than thinking of it in terms of the means of achieving that goal (i.e., descriptive action verbs). For example, a person's behavior can be construed as "picking an apple off of a branch" (low level construal, a specific event) or as "getting something to eat" (high level construal reflecting a more broadly defined goal that is achievable in multiple ways). Both levels of construal can be true descriptions of an ongoing behavior.

Recent work in social psychology has shown that adopting a high-level of construal leads to higher levels of self control than does adapting a lower level of construal (Fujita, Trope, Liberman & Levin-Sagi, 2006). A series of critical experiments

has demonstrated the impact of adapting different construal levels (CL) on behaviors. In these experiments, participants underwent a construal level manipulation where they are asked to perform a cognitive task designed to raise or to lower their construal level. For the construal level manipulation, all participants are first given a statement (e.g. "I brush my teeth"). A high level construal manipulation has participants write about "why" it is they perform this behavior, whereas a low level construal manipulation has participants write about "how" it is that they perform this behavior. Participants undergo this process for several behaviors. Previous research has found that by asking someone why it is they engage in a behavior induces high-level construal and by asking someone how it is they engage in a behavior induces low level construal (Freitas, Gollwitzer & Trope, 2004). Thinking of "why" induces high level construal because it causes participants to consider the essential attributes and goals of the behavior. On the other hand, thinking about "how" induces a low level construal because it induces participants to think of the highly detailed methods involved in performing this behavior. The high CL group is instructed to write "why" it is they would have the goal they just wrote down, and then asked "why" they would adapt the second goal, and so forth for several times. The low CL group is instructed to write "how" they would perform the behavior they just wrote down, and then "how" it is they would perform *that*, and so for, again for several iterations. Construal level has been found to generalize to other contexts over a short period of time. In other words, causing participants to adapt a construal level on one task will influence the construal level that they adapt while performing subsequent unrelated tasks.

In order to demonstrate that adopting higher construal levels leads to greater self-control, participants are asked to perform a painful task after having their construal level manipulated (Fujita *et al*., 2006). One such task involves squeezing a very tense hand grip. Participants have faux electrodes attached to them and are told that a machine is able to give information regarding their personality. They are lead to believe that the longer they squeeze handgrips, the more accurate this information will be. Those participants who have been primed with a higher construal level squeeze the hand grip longer. One popular explanation for these findings is that high-level construal priming causes one to focus on abstract and general interpretations of the behavior (here, receiving important information about their personalities). Low-level construal priming might be inducing participants to focus on specific and concrete aspects of the behavior (such as the pain they have to endure while squeezing a hand grip).

To summarize, social psychologists have demonstrated that increased construal levels lead to better self-control and clinical psychologists have demonstrated that increases in self-control protect people from developing some forms of psychopathology. Combining the findings from these two branches of psychology would lead one to conclude that higher construal levels should protect people from developing some forms of psychopathology. They would do this by increasing the self-control capacities necessary to override or compensate for their reactive vulnerabilities. It is important to directly assess this CLT theory-based prediction for two reasons. First of all, it is possible that clinical and social psychology researchers use a similar vocabulary (e.g. "self-control") but in different ways. Thus, nuances in the way these theories were developed might make it so that they are not referring to the same phenomena. Second of all, it is

also possible that both theories are true in the contexts that they were developed, but that psychopathological context is qualitatively different than a normal functioning context

Despite the prediction implied by the self-control implications of CLT, a trend in experimental clinical psychology makes precisely the opposite claim (e.g. Emmons, 1992; Stöber & Borkovec, 2002). For example, Watkins claims that higher construal levels make people more likely to be depressed. In one study, Watkins, Moberly & Moulds (2008) experimentally manipulated the level at which individuals construe behaviors. A series of both positively and negatively valenced scenarios are presented to participants. The participants in the high construal level condition are instructed to think about the causes and implications of the events, in an effort to have them think more abstractly. The participants in the low level construal condition are instructed to vividly imagine the event as it occurs, in an effort to make them think more concretely. A manipulation check reveals that the construal levels of the two groups actually shifted in the desired direction. Both groups are asked to perform a task that is rigged so that all participants fail. Participants are told that successful completion of the task is predictive of future professional success. After failing the task, participants in the high construal level group felt more despondent. Thus, Watkins claims that high construal levels can increase one's emotional reactivity. "Emotional reactivity" should not be confused with "temperamental reactivity," although these concepts are in certain respects similar, since they originated from different theoretical contexts.

Watkins proposes that while adopting a higher construal level leads to greater distress in the short term, a similar phenomenon can lead to more depression in the long term. To support this, Watkins, Baeyens & Read (2009) ran a proof-of-principle study to

test the efficacy of concreteness training for reducing depression. An experimental group of depressed individuals underwent a series of meditative, relaxing and concreteness-inducing exercises for several weeks. Among other tasks, these participants were asked to visualize events in a concrete fashion. Some of the visualized events were autobiographical events that actually occurred to the participants and were important to them, and some of the events were imagined. The control groups were a wait-list group and a bogus-concreteness training group. The bogus-concreteness training involved completing the meaning of scripts with words that implied a concrete interpretation of the scenarios. The experimental group showed greater improvements in depressive symptoms relative to the control groups after several week of training.

Given these conflicting predictions of CLT and the model developed by Watkins regarding the implications of high levels of construal for psychopathology, this study sought to test these competing models using well-accepted questionnaires that were designed to assess construal level, temperamental emotional reactivity, and emotional disorder symptoms. Specifically, the predictions of CL Theory will be supported if *high* CL is found to be associated with lower symptoms of emotional distress and further, if *high* CL is found to be associated with reduced correlations between high NA or low PA and such symptoms. In contrast, the predictions of the model developed by Watkins will be supported if *low* CL is associated with lower symptoms of emotional distress and further, if *low* CL is found to be associated with reduced correlations between high NA or low PA and such symptoms.

Method

Participants

126 participants were recruited from a pool of undergraduates at an introductory psychology course at a large Midwestern university. Participants were allowed to not be part of research if they agreed to an alternative educational task. All participants gave consent at the beginning of the study, and knew that they were allowed to terminate participation at any time with no penalty.

Participants were prescreened using the Positive and Negative Affectivity Scales (PANAS; Clark & Watson, 1991). All individuals who scored in the top and bottom quartiles on NA and PA were invited to participate in the study along with a random sample of people from the middle two quartiles. The goal of this procedure was to maximize variability on the constructs of interest. The mean age of the sample was 19.2 years (*SD* = 2.4) with 94% of the participants between the ages of 18 and 22, inclusively; 61% were women. With regard to race/ethnicity, 84.9% were Caucasian, 5.6% were Asian, 3.2% were Black, 2.4% were Hispanic, and 4.0% were biracial or multiracial.

Procedure

The study was run in the Cognition and Emotion laboratory in the Psychology Building on the campus of the Ohio State University. Questionnaires relevant to this study were completed as part of a larger set of measures. The participants were given several questionnaires during the third of three testing and assessment sessions that were part of other experiments not described here. The only questionnaire that was administered at a different session was The Balanced Inventory of Desirable Responding-Impression Management, which was administered at the first of the three testing sessions.

These three sessions were conducted at the beginning, middle, and end of the quarter respectively. Informed consent was obtained from participants at the start of the first of three experimental sessions. After the experiment, all participants were debriefed and offered access to mental health resources.

Measures

Adult Temperament Questionnaire – Short Form (ATQ; Rothbart, M. K., Ahadi, S. A., & Evans, D. E., 2000*).* The ATQ short form is a self-report questionnaire designed by Mary Rothbart and colleagues to measure aspects of temperament. It consists of 77 items divided into subscales that measure negative reactivity, positive reactivity and effortful control. Participants are prompted to asses on a 7 point Likert scale how true each of the 77 statements is of them. It measures NA, PA and EC. Each measure has subscales that will not be used in the analysis: frustration, social anger, sadness and fear; high intensity pleasure, positive affect, and sociability; and activation control and effortful attention, inhibition, respectively for NA, PA and EV. This is a popular measurement, and the NA, PA and EC scales have all been shown to possess high internal consistency (Derryberry & Rothbart, 1988).

Behavior Identification Form (BIF; Vallacher, R.R. Wegner, D. M., 1989*).* The BIF is a measure that probes a respondent's tendency to construe behaviors at high or low levels. It has been noted that thinking of the goals of behaviors often involves more abstract forms of thought that thinking of the means taken to achieve a goal (e.g. Freitas, Gollwitzer & Trope, 2004, 2004). The BIF is comprised of 25 dichotomous forced choice questions, each asking the respondent to choose which of two descriptions best describes a human activity. One response is a high and one low level construal of the same

situation. The low level construal option is ascribed a value of 1 while the high level construal option is ascribed a value of 2. The summed up score reflects the number high construal alternatives that the respondent chooses. Construal level as assessed by the BIF has been found to be stable over several weeks. The divergent validity of this measurement was demonstrated by its lack of correlation with possibly related psychological constructs including mental ability, tolerance of ambiguity, dogmatism, and self-focus.

Depression Anxiety and Stress Scale (DASS; Lovibond & Lovibond, 1995*)* The DASS is a 42-item self-report questionnaire designed to measure depression (e.g. feelings of worthlessness, anhedonia, etc.), anxiety (e.g. panic and various physiological correlates of hyperarousal) and stress (tension, irritability, etc.). Although these three subscales are related, DASS was designed through factor analysis to able to discriminate between them. (Crawford, J. R. & Henry, J. D., 2003; Lovibond S.H., Lovibond P.F., 1995). DASS scales have been shown to have excellent internal consistency and reliability. Participants are to indicate on a 0 to 3 scale how much a given statement applied to them over the past week ("0 Did not apply to me at all" to "3 Applied to me very much, or most of the time").

The Beck Depression Inventory-II (BDI-II; Beck, Steer, & Brown, 1996) The BDI-II is a widely used self-report questionnaire developed comprised of 21 questions that has been extensively evaluated. It assesses depressive symptoms such as hopelessness, depressive cognitions such as guilt, and physical symptoms such as weight loss or gain. It has excellent psychometric properties.

The Balanced Inventory of Desirable Responding-Impression Management (BIDR-Im; Paulhus, 1984). The impression management subscale of the BIDR prompts participants to rate how much they agree with items that generally reflect cultural norms. Each item is stated as a proposition, requiring respondents to indicate on a 7-point Likert response scale their level of agreement with each of the statements. Higher scores indicate a tendency to endorse items in a socially desirable manner. This instrument has also been shown to possess excellent psychometric properties.

Results

Descriptive Statistics and Preliminary Analyses

Descriptive statistics for the measures of construal level, temperamental variables, symptom measures, and impression management are displayed in Table 1.

Out of 143 who participated in the experiment, only the data of 125 were used in the following analysis. Data were dropped for those participants who did not complete all the essential questionnaire measures and for those participants in whose data obvious patterns were observed leading us to conclude that they did not honestly attempt to answer the questions. The data of one participant were dropped since their scores were outliners and influential.

DASS-Depression and BDI scores indicate that the average participant in this study was only mildly depressed. The mean scores on the BIF are similar to those found in previous research with undergraduates (Vallacher *et al.,* 1989).

Main Analyses

Correlations

All correlations are included in Table 2. Construal level was negatively correlated with NA (Pearson's r = -.305, p<.014) and positively correlated with PA (Pearson's r = .294, p<.01). BIF scores are positively correlated with EC (r =.275, p <.01).

Zero-order correlations between construal level and all measures of emotional symptoms were negative and significant with the BIF–DASS-Depression correlation being the strongest. BDI scores were highly correlated with DASS-Depression (r =.841) but less so with DASS-Stress, and the least with DASS-Anxiety. The high correlation between DASS-Depression and the BDI was to be expected since both instruments are designed to measure depressive symptoms. Given their overlap, the two scores were aggregated to forma Depression Composite to reduce redundancy in analysis. This composite was created by standardizing and averaging the two scores.

Main Analysis

Construal Level as a Moderator between Temperament and State Pathological Symptoms

The hypothesis that BIF scores would moderate the association between emotional symptoms and both NA and PA was tested by a series of hierarchical regression analyses. Aside from Gender, all variables were standardized prior to entry.

Model 1 was developed to test the primary hypothesis for Depression Composite. On Step 1, Gender, Z-BIDR-Im, Z-NA, Z-PA and Z-BIF were entered. On Step 2, both the NA x BIF and PA x BIF interaction terms were entered. Results are shown in Table 3.

Whereas the NA x BIF interaction was significant (p =.006), the PA x BIF interaction was not significant (p =.984).

Model 2 assessed the extent to which construal level moderates the relationship between temperamental traits and DASS-Stress scores. Steps 1 and 2 of Model 2a were identical to model 1. As shown in Table 4a, whereas the NA x BIF interaction was significant (p =.015), the PA x BIF interaction was not (p =.301). A follow up model was run to test if the significance of the interactions in DASS-Stress was simply due to the variance shared between DASS-Stress and DASS-Depression. Results for the follow up model are displayed in Table 4b. Model 2b had steps 1 and 2 identical to model 2a, with the exception that DASS-Depression was also entered on the first step. Neither the NA x BIF interaction (p =.183) nor the PA x BIF interaction (p =.117) proved significant.

Model 3 assessed the extent to which construal level moderated the relationship between temperamental traits and DASS-Anxiety. Steps 1 and 2 were identical to Model 1. Neither the NA x BIF (p =.373) nor the PA x BIF (p =.934) interactions achieved significance. These results are summarized in Table 5.

Discussion

Results of this study showed that higher construal level was not significantly associated with lower emotional symptoms on average. However, construal level moderated the association between NA and symptoms such that higher construal was associated with reduced correlation between NA and symptoms. This pattern was limited to depressive symptoms. Although it also emerged for symptoms common to depression and anxiety problems (i.e.DASS-Stress scores), that association was a function of the

correlation between these common symptoms and those unique to depression. Thus, when depressive symptoms were included in the model, the NA x Construal Level interaction was no longer significant for DASS-Stress scores. Construal level did not moderate the relationship between NA and anxiety symptoms. Unexpectedly, construal level did not moderate the relationship between PA and any of the emotional dimensions.

The current findings are consistent with the hypothesis implied by the self-control applications of CLT (i.e. Fujita *et al.* 2006), but not with the hypothesis implied by emotional reactivity research (i.e. Watkins *et al.,* 2008). A possible causal mechanism for the current findings is that a high construal level increases self-control necessary to engage in behaviors that protect individuals from depression. For individuals low in NA, construal level is not relevant either way to their depressive symptoms. However, this is consistent with both theories. According to the self-control application, if a person is low in NA, they are not at risk for developing depression in the first place so better self-control would not make them any more less likely to be depressed. The emotional reactivity research would hypothesize that even if a person's NA is low, even high construal levels could not make their negative emotional reaction bad enough to lead to a depressive state.

The finding that construal levels do not moderate the relationship between NA and anxiety is consistent with the self-control model derived from CLT. Anxiety as measured by the DASS does not refer to "worry", as it does in popular usage of the term. Rather, "anxiety" as referred to by the DASS refers to symptoms of physiological hyperarousal such as profuse sweating. The self-control research in CLT is primarily concerned with behavioral self-control, not with the capacity to better regulate

physiological hyperarousal. Admittedly, further research should inquire as to if, (and if so, why) higher construal levels do not help in individuals engage in behaviors that indirectly protect them from or reduce physiological hyperarousal. In passing mention, the fact that construal level does moderate the relationship between NA and DASS-Anxiety is not contrary to the core assumptions of the emotional reactivity model since the model does not make unambiguous claims either way.

That construal level was not found to moderate the relationship between NA and stress poses a potential problem to both the self-control model and the emotional reactivity model. The Stress subscale of the DASS refers to experiences of mental restlessness and impatience (Lovibond *et al*., 1995). Further research should first replicate and then clarify why it is that neither the increases in construal levels, nor the increases in emotional reactivity associated with higher construal levels were found to be relevant to stress as measured by the questionnaire.

The lack of moderation of construal level on the relation between PA and all emotional symptoms is also inconsistent with the self-control applications of CLT. Higher levels of self-control should permit a person low in PA to nonetheless approach potentially rewarding situations. However, it is possible that the PA x BIF interaction was not significant because BIF and PA are both related to depressive symptoms for similar reasons. This makes sense because higher construal levels increase self-control, and PA is also associated with a tendency to be engaged with the world. In other words, both higher construal levels and higher levels of PA make a person more likely to engage in adaptive behaviors. Depression involves low positive affectivity, and this is reflected in that the DASS probes inquires into constructs such as anhedonia, hopelessness and devaluation of

life when probing for depression (Lovibond *et al*., 1995). Recent data suggests that PA moderates the relationship between NA and depression (Dougherty, Klein, Durbin, Hayden, & Olino, 2010; Vasey, M. W., unpublished data). Construal level might be one of the ways via which this NA x PA interaction is achieved.

It is still an open question if higher temperamental PA causally leads to greater construal levels or vice versa, but it has already been experimentally demonstrated that short term neutral and happy moods influence more global, abstract processing styles. On the other hand, inducting a sad mood can shift a person to a lower construal level (Beukeboom & Semin, 2005, Gasper & Clore, 2002). State symptoms of depression, such as the one measured by the DASS, are certainly indicators of a negative mood. The mood studies are generally not done with negative moods that reach pathological proportions. By extrapolation, though, it would be consistent with the current study. Thus it is possible that depression itself lowers construal levels. An unfortunate situation of positive feedback might be occurring when negative emotions lower the construal level of individuals, and these low construal levels in turn prevent a person from engaging g in optimally adaptive behaviors. This positive feedback cycle is one possible etiology for depression.

The relationship between verbal behavior and real-world behavior is tenuous. Therefore, future research should manipulate construal level before individuals engage in behaviors that are potentially preventive from depression in order to experimentally confirm that the causal mechanism are indeed those suggested by the self-control applications of CLT.

Manipulating construal level may also have therapeutic applications because construal level is more easily manipulated than temperamental reactivity. Previous studies that attempted to manipulate construal levels for therapeutic gains seem to have confounded a construal level manipulation with a meditative regime. Construal level involves how one thinks about behavior. However, the experimental group designed by Watkins *et al*. (2009) underwent various forms of bodily relaxation and visualization exercises that allowed opportunities to become desensitized form negative memories. Firm conclusions cannot be therefore drawn about the role of therapeutic value of lowering construal level for depression. A more adequate control group would have undergone the same meditation and memory exercises, but primed to do so at a high construal level.

Previous experimental work in a non-pathological setting can be read as suggesting that the manipulation of construal levels is one of the active ingredient of successful psychotherapies. An active ingredient of a therapy is an element of the therapy that drives the therapeutic change. Schmeichel and Vohs (2009) found that under circumstances of ego-depletion, those participants who complete a self-affirming cognitive task were better able to control themselves in a physically unpleasant situation than those in a no-affirmation condition. Specifically, they were able to hold their hand in cold water longer. This effect only emerged only for participants that who previously fatigued. The self-affirmation condition involved writing about why a value is important to them and describing a time in their life when a value was important to them. Subsequent experiments showed participants who undergo the self-affirmation task adopt a higher construal level, as measured by the BIF. It is noteworthy that Cognitive

Behavioral Therapy (CBT) involves cognitive tasks similar to the self-affirmation manipulation of the Schmeichel (2009) study (Beck, 1963). For example, therapists often encourage their clients to assess the validity of their core beliefs. This task likely involves pondering on the deeper implications of one's value structure. *In-situ* validations of this hypothesis are warranted.

This study demonstrates that, on the whole, higher construal levels are associated with less risk for depression. We suggest that construal levels do indeed lead to greater emotional reactivity, as Watkins *et al*. claim (2008), but that higher construal levels play other functions as well. One function that higher construal levels play is to increase self control, and this increased self-control might be more important than the potentially pathological increase in emotional reactivity associated with higher construal levels. The model developed by Watkins considers primarily the role of construal levels when thinking about previous behaviors. The self-control literature on the other hand considers the role of construal levels when thinking about future behaviors. However, the model developed below allows that even when thinking about previous behaviors, higher construal levels can be benefic.

Some of the developers of CLT maintain that in order for a thought to be a "goal" it must have self-evaluative implications (Förster, Liberman & Friedman, 2007). We find it plausible that adapting a higher construal level interpretation of some random behavior will not in itself bring about any specific emotion. It is the status of having (or predicting) the attainment/failure of a self-relevant goal that brings about the full emotional repercussions. Low-level construals would still have emotional repercussions since the actions taken to achieve a goal are themselves less important sub-goals.

The implications of high versus low level construals of positive events have not been adequately studied in the depression research (Watkins, 2008b). This is because of the experimental manipulations and outcome measurements in research on psychopathology usually involve negative life events. Experimental work with non-clinical populations has demonstrated that the increased emotional reactivity associated with higher construal levels can sometimes be benefic. Marigold, Holmes & Ross (2007) asked low self-esteem participants to describe a compliment made by their partners at either high low construal. The high construal group was instructed to think about the meaning and implications of the compliments whereas the low construal group was instructed to think of contextual details of the situation. Both after right after, and two weeks after the manipulation, low self-esteem participants in the high-level construal group reported feeling happier and having higher self-esteems.

Higher construal levels might indeed make individuals with low PA feel better. Even if this effect does occur on the short run, the current data suggests that this mechanism is not enough to translate into lower depressive symptoms. This is troublesome for the emotional reactivity theory. However, it is not a direct falsification of the emotional reactivity theory since empirical research so far has not give a central role to exploring reactions to positive experiences.

High level construals of previous events of both positive and negative valence are potentially adaptive. Drawing *some* general conclusions from previous failures is essential for adequate self-understanding. The risk for psychopathology might only emerge when an individual chronically construes negative events at a high level and positive events a low level Certain personality differences other than construal level

probably determine which events are construed at what level. For example, low self-esteem individuals are known to readily over-generalize the implications of failures, but consistently fail to understand the deeper implications of compliments. A similar process might lead to depression. Therapists would need to realize when clients are construing life events at a too high or too low of a level and help them adjust accordingly. Further applications of CLT to psychopathology need to take make more nuanced hypothesis about construal levels than wide-sweeping statements of the sort "high construal levels are good" or "low construal levels are good."

This study has many limitations that all studies that rely on self-assessment methods would have. Precautions were taken to ensure that demand-effects not play a major role in assessing the hypothesized moderations by the inclusions of the BIDR-Im scale. However, it is possible that participants either have poor self-knowledge about their own emotional situations, or that systematic memory biases are polluting the results to the questions asked of them.

Despite its limitations, questionnaire-based study is an adequate way to begin testing these seemingly contradictory theories head to head. A questionnaire study provides the opportunity to inquire into the main effects that a cognitive phenomenon can play on an individual's mental health. We found that higher construal levels are associated with lower levels of depressive symptoms for individuals high in NA. In the CLT/psychopathology debate, therefore, it is possible that higher CLs *do* lead to a bad emotional reactivity, but that higher CLs *also* lead to good emotional reactivity. Further, higher construal levels might imbue people with the self-control necessary to engage in

behaviors that buffer them from depression. The benefic aspects of higher CLs might be more important on the long run than some of their negative consequences.

References

Baer, A. R., Smith, G. T., Hopkins, J., Krietemeer, J. & Toney, L., (2006). Using self-report assessment methods to explore facets of mindfulness. *Assessment*, 13(1) 27.

Baumeister, R. F., & Heatherton, T. F. (1996). Self-Regulation Failure: An Overview. *Psychological Inquiry, 7(1),* 1-15.

Beck, A.T. (1963) Thinking and Depression: 1. Idiosyncratic Content and Cognitive Distortions. *Archives of General Psychiatry, 9*, 324-33.

Beck, A. T., Steer, R. A., & Bworn, G. K. (1996). *Beck Depression Inventory Manual* (2nd ed.) San Antonio, TX: Psychological corporation.

Beukeboom, C. J., Semin, G. R. (2005). Mood and representations of behaviour: The how and why. *Cognition and Emotion*, 19(8), 1242-1251.

Clark, L. A. & Watson, D. (1991). Tripartite model of anxiety and depression: Psychometric evidence and taxonomic implications. *Journal of Abnormal Psychology, 100*, 316-336.

Clark, L. A., Watson, D., & Mineka, S. (1994). Temperament, personality and the mood and anxiety disorders. *Journal of Abnormal Psychology, 103*, 103-116.

Crawford, J, R., Henry, J. D. (2003). The Depression Anxiety Stress Scales (DASS): Normative data and latent structure in a large non-clinical sample. *British Journal of Clinical Psychology*, 42(2), 111-131.

Derryberry, D., & Rothbart, M. K. (1988). Arousal, affect, and attention as components of temperament. *Journal of Personality and Social Psychology, 55*, 958-966.

Dougherty, R. S., Klein, D. N., Durbin, C. E., Hayden, E. P., & Olino, T. M. (2010). Temperamental Positive and Negative Emotionality and Children's Depressive Symptoms: A Longitudinal Prospective Study from Age Three to Age Ten. *Journal of Social and Clinical* Psychology, *29 (4),* 462-488.

Drabman. R. S., Spitalnik, R., & O'Leary, K. D. (1973) Teaching self-control to disruptive children. *Journal of Abnormal* Psychology, *82 (1),* 10-16.

Emmons, R. A. (1992). Abstract versus concrete goals: Personal striving level, physical illness, and psychological well-being. *Journal of Personality and Social Psychology, 62(2),* 292-300

Förster, J., Liberman, J. N., Friedman, R. S. (2007). Seven principles of goal activation: A systematic approach to distinguishing goal priming from priming of non-goal constructs. *Personality and Social Psychology Review, 11(3),* 211-233.

Freitas, A. L., Gollwitzer[b], P., Trope, Y. (2004). The influence of abstract and concrete mindsets on anticipating and guiding others' self-regulatory efforts. *Journal of Experimental Social Psychology, 40(6),* 739-752.

Fujita, K., Trope, Y., Liberman, N., & Levin-Sagi, M. (2006). Construal levels and self-control. *Journal of Personality and Social Psychology, 90(3),* 351-367.

Gasper, K., Clore, G. K. (2002). Attending to the big picture: Mood and global versus local processing of visual information. *Psychological Science, 13(1),* 34-40.

Higgins, E.T., & Kruglanski, A. W. (2000). *Motivational science: Social and Personality Perspective*. Philadelphia: Psychology Press.

Judge, T. A., Higgins, C. A., Thoresen, C. J., & Barrick, M. R. (1999). The big five personality traits, general mental ability, and career success across the life span. *Personnel Psychology, 52(3),* 621-652.

Kaiser, S, Unger J., Kiefer M., Markela J., Mundt C., & Weisbrod M. (2003). Executive control deficit in depression: event-related potentials in a Go/Nogo task. *Psychiatry Research-Neuroimaging, 122(3),* 169-184.

Leon, G. R., Gillum, B., Gillum, R., & Gouze, M. (1979) Personality stability and change over a 30-year period--middle age to old age. *Journal of Consulting and Clinical Psychology, 47(3),* 517-524.

Lonigan, C. J., & Vasey, M. W. (2009). Negative affectivity, effortful control, and attention to threat-relevant stimuli. *Journal of Abnormal Child Psychology, 37(3),* 387-399

Lonigan, C. J., Vasey, M. W., Phillips, B. M., & Hazen, R. A. (2004). Temperament, anxiety, and the processing of threat-relevant stimuli. *Journal of Clinical* Child, *33(1),* 8-20.

Lovibond, P. F. & Lovibond, S. H. (1995). The structure of negative emotional states: Comparison of the Depression Anxiety Stress Scales (DASS) with the Beck Depression and Anxiety Inventories. *Behaviour research and therapy*, 33(3) 335-343.

Marigold, D. C., Holmes, J. G., Ross, M. (2007). More than words: Reframing compliments from romantic partners fosters security in low self-esteem individuals. *Journal of Personality and Social Psychology, 92(2),* 232-248.

McCrae, R. R., & Costa, P. T. (1997). Personality trait structure as a human universal. *American Psychologist, 52(5),* 509-516.

Moyle, P. (1995). The role of negative affectivity in the stress process: Tests of alternative models. *Journal of Organizational Behavior, 16(6),* 647-668.

Paulhus, D. (1984) 2-Component models of socially desirable responding. *Journal of personality and Social Psychology, 46(3),* 598-609.

Rothbart, M. K., Ahadi, S. A., & Evans, D. E. (2000).Temperament and personality: Origins and outcomes. *Journal of Personality and Social Psychology, 78(1),* 122-135.

Rothbart, M. K., & Bates, J. E. (1998). Temperament. In W. Damon (Series Ed.) & N. Eisenberg (Vol. Ed.), *Handbook of child psychology: Vol. 3. Social, emotional and personality development* (5th ed., pp. 105-176). New York: Wiley. Temperament-Part 1 (105-139) & Temperament-Part 2 (140-176).

Schmeichel, B. J., & Vohs, K. D. (2009). Self-affirmation and self-control: Affirming core values counteracts ego depletion. *Journal of Personality and Social Psychology, 96(4),* 770-782.

Semin, G. R., & Klaus, F. (1988). The cognitive functions of linguistic categories in describing persons: Social cognition and language. *Journal of Personality and Social Psychology, 54(4),* 558-568.

Stöber, J., & Borkovec, T. D. (2002). Reduced concreteness of worry in generalized anxiety disorder: Findings from a therapy study. *Cognitive Therapy and Research, 26(1),* 89-96.

Trope, Y., Liberman, N. (2003). Temporal construal. *Psychological Review,* 110(3), 403-421.

Vallacher, R. R., & Wegner, D. M. (1989). Levels of personal agency: Individual variation in action identification. *Journal of Personality and Social Psychology, 57(4),* 660-671.

Watson, D., & Clark, L. A. (1984). Negative affectivity: The disposition to experience aversive emotional states. *Psychological Bulletin, 96(3),* 465-490.

Watkins, E. R. (2008b) Constructive and unconstructive repetitive thought. *Psychological Bulletin, 134(2),* 163-206.

Watkins, E. R., Moberly, N. J., & Moulds, M. L., (2008). Processing mode causally influences emotional reactivity: Distinct effects of abstract versus concrete construal on emotional response. *Emotion, 8(3),* 364-378**.**

Watkins, E. R., Baeyens, C. B., & Read, R. (2009). Concreteness training reduces dysphoria: Proof-of-principle for repeated cognitive bias modification in depression. *Journal of Abnormal Psychology, 118(1),* 55-64.

Table 1 *Descriptive Statistics*

	N	*Min*	*Max*	*M*	*(SD)*
ATQ – NA Total	127	28.0	150.0	103.7	21.33
ATQ – PA Total	127	12.0	35.0	23.75	5.407
ATQ – EC Total	127	44.8	133.0	82.58	14.31
BIF	126	.00	25.0	14.70	4.819
DASS - Stress	127	.00	37.0	10.29	9.121
DASS - Anxiety	127	.00	33.0	5.127	6.138
DASS - Depression	127	.00	38.0	5.522	6.921
BDI	127	.00	39.0	9.213	9.256
BIDR-Im	143	37.0	128.0	77.50	15.54

Abbreviations defined above in Methods.

Table 2 *Correlations Between Variables and Cronbach's Alphas*

	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*
1. ATQ – NA Total	(.887)								
2. ATQ – PA Total	-.359**	(.700)							
3. ATQ – EC Total	-.528**	.335**	(.845)						
4. BIF	-.305**	.294**	.275**	(.796)					
5. DASS - Stress	.554**	-.401**	-.490**	-.282**	(.932)				
6. DASS - Anxiety	.402**	-.374**	-.378**	-.227*	.728**	(.858)			
7. DASS - Depression	.388**	-.584**	-.350**	-.290**	.732**	.576**	(.908)		
8. BDI	.493**	-.534**	-.474**	-.262**	.768**	.626**	.841**	(.939)	
9. BIDR - Im	-.321**	.341**	.297**	.300**	-.302**	-.225*	-.255**	-.293**	(.748)

NOTE: Values on the diagonal in (parenthesis) are Cronbach's Alphas for the scale.

*p<.05; **p<.01

Table 3 *Hierarchical Regression Analysis Results for Depression Composite*

	B	SE	ß	*p*-value	*sr*	R^2	R^2 Change
Step 1						.403	
Step 2						.462	.059*
(Constant)	-.123	.112		.275			
Gender	.102	.145	.052	.485	.048		
Z-BIDR-Im	-.029	.074	-.030	.696	-.027		
Z-BIF	-.118	.073	-.122	.109	-.110		
Z-ATQ.NA	.272	.087	.260	.002	.213		
Z-ATQ.PA	-.441	.079	-.440	.000	-.378		
NAxBIF	-.266	.094	-.251	.006	-.191		
PAxBIF	-.002	.096	-.002	.984	-.001		

Note: Z-x=Standardized values for x, where x= NA, PA, BIF, BIDR-Im;

sr = semi-partial correlation coefficient.

*F (2,117)=6.374, p =.002

Table 4a *Hierarchical Regression Analysis Results for DASS-Stress*

	B	SE	ß	*p*-value	*sr*	R^2	R^2 Change
Step 1						.375	
Step 2						.408	.033*
(Constant)	9.819	1.134		.000			
Gender	.821	1.468	.044	.577	.040		
Z-BIDR-Im	-.671	.748	-.072	.372	-.064		
Z-BIF	-1.243	.736	-.134	.094	-.120		
Z-ATQ.NA	4.404	.873	.438	.000	.359		
Z-ATQ.PA	-1.761	.798	-.183	.029	-.157		
NAxBIF	-2.353	.950	-.231	.015	-.176		
PAxBIF	-1.006	.968	-.095	.301	-.074		

Note: Z-x=Standardized values for x, where x= NA, PA, BIF, BIDR-Im;

sr = semi-partial correlation coefficient.

**F* (2,117)=3.258, *p* =.042

Table 4b *Hierarchical Regression Analysis Results for DASS-Stress while Controlling for Depression Composite*

	B	SE	ß	*p*-value	*sr*	R^2	R^2 Change
Step 1						636	
Step 2						645	008*
(Constant)	.413	.015		000			
Gender	856	.142	045	455			
Z-ATQ.NA	.118	695	310	000			
Z-ATQ.PA	.110	701	115	116			
Z-BIF	.444	580	.048	445			
Z-BIDR- Im	.686	582	.074	241			
DASS-Dep	847	096	636	000			
NAxBIF	1.012	755	.099	**.183**			
PAxBIF	1.190	753	.112	**.117**			

Note: Z-x=Standardized values for x, where x= NA, PA, BIF, BIDR-Im;

sr = semi-partial correlation coefficient

(NOTE: data not final)

Table 5 *Hierarchical Regression Analysis Results for DASS-Anxiety*

	B	SE	ß	*p*-value	*sr*	R^2	R^2 Change
Step 1						.202	
Step 2						.211	.010
(Constant)	5.088	.887		.000			
Gender	.132	1.147	.010	.909	.009		
Z-BIDR-Im	-.235	.585	-.037	.689	-.033		
Z-BIF	-.596	.575	-.095	.302	-.085		
Z-ATQ.NA	1.801	.682	.265	.009	.217		
Z-ATQ.PA	-1.408	.624	-.216	.026	-.185		
PAxBIF	-.665	.743	-.096	.373	-.073		
NAxBIF	-.063	.757	.009	.934	.007		

Note: Z-x=Standardized values for x, where x= NA, PA, BIF, BIDR-Im;

sr = semi-partial correlation coefficient.

**F* (2,116)=.727, *p* =.486